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been appointed associate professor of geography; Professor Russell S. Knappen, of the University of Chicago, has been appointed assistant professor of economic geology, and Dr. Walter H. Schoewe, of the Colorado School of Mines, has been appointed assistant professor of geology. Dr. Winthrop P. Haynes, associate professor of geology, is absent on leave and will undertake for the Standard Oil Company of New Jersey explorations in northern Mexico.

At the Carnegie Institute of Technology new appointments have been made as follows: In the division of science and engineering are C. R. Clutter, Lauren C. Hand and Frank E. Rupert, instructors in chemical engineering; R. W. Boreman, W. H. Michner and A. Press, instructors in physics; Charles A. Blodgett and Fred J. Evans, instructors in civil engineering; W. S. McKee, instructor in machine design; David C. Saylor, instructor in mechanical engineering; W. A. Copeland, instructor in metallurgical and mining engineering, W. Z. Price, assistant professor in mining engineering, and C. G. Simpson, instructor in the mechanics department. In the division of industries are Charles B. Walker and F. N. Talley, instructors in chemistry, and James Creech, instructor in press work, in the printing department.

DISCUSSION AND CORRESPONDENCE AN INSTITUTION FOR TROPICAL RESEARCH

TO THE EDITOR OF SCIENCE: The immense importance of the tropics and of tropical products to the future of industry is being more and more widely recognized. The most rapid developments of the future will inevitably lie to the southward since only there can now be found unlimited, unused opportunity. The greatest volume of trade must ultimately flow north and south rather than east and west since east and west have in the main similar products while those of north and south are complementary. The necessity for a much more accurate and extensive knowledge of tropical conditions, products and resources is being realized by many.

Concrete plans for an American institution devoted to tropical research seem first to have been suggested in the Philippines, where such tremendous strides have been taken along these lines since the American occupation of these islands. Director Arthur F. Fischer, of the Philippine Bureau of Forestry, and Dean C. F. Baker, of the College of Agriculture, have been particularly active in this propaganda. When the Roosevelt Memorial Association was formed it occurred to the present writer that the foundation of such an institution would be a most fitting memorial to the memory of that strenuous advocate of the conservation of natural resources and explorer of tropical wildernesses. An outline for the organization of a Roosevelt Memorial Institution for the Study of Tropical America was accordingly drawn up and was submitted to the association but no favorable action was secured.

At the close of the war the National Research Council was organized from what had been the Council for National Defense. It is understood that the importance of tropical problems has been given due consideration by this body, and that committees have been appointed who have submitted reports but that so far no final action has been taken toward formulating a concrete plan for tropical work. The writer has no connection with the Council for National Research but his interest in everything relating to tropical problems is so great that he begs permission to submit the following for the consideration of this body:

OUTLINE FOR THE ORGANIZATION OF THE ROOSEVELT INSTITUTION FOR TROPICAL RESEARCH UNDER THE AUSPICES OF THE NATIONAL RESEARCH COUNCIL

1. This institution should be organized as a special section of the council with a permanent secretary and an office force to collate and index existing knowledge of tropical resources and conditions. A bibliographic card index should be made indicating in what libraries¹ given works can be consulted.

¹ The necessity for such information as this was forcibly brought home to the writer during a recent visit to the libraries of Washington and New

2. All workers should be registered who are able and willing to undertake tropical investigations. Men occupying regular positions can usually secure leave of absence to undertake special investigations in their respective lines. This register should include not only scientific workers in the United States but those from all parts of America and for that matter those from any other part of the world who would care to interest themselves in American problems.

3. Once such a list of available workers has been secured then let it be widely known to the different governments of the Pan-American Union that the institution is in a position to furnish the best attainable expert service, and to supervise all such governmental scientific projects as geological surveys, including special studies of mineral resources; forestry surveys, including suggestions for the utilization of existing forest products and the reforestation of denuded areas; physiographic surveys; archeological studies; faunal or floral studies; special industrial problems; or the investigation of plant diseases, injurious insects or other special agricultural problems.

At the present time when really competent investigators are hard to obtain, the temporary services of the highest class of experts, vouched for and supervised by such an institution, should be very attractive to the governments concerned. The exact form of agreement with the institution and with individual workers could be determined independently in each case. The investigators might receive temporary appointments as officials of the interested governments and their reports be published as official documents by such governments, or any other arrangement could be made that would be mutually satisfactory.

4. In like manner it should be made known to the different industries dependent on trop-

ical products that the resources and personnel of the institution were at their service for the study of any of their special problems. Many of these industries now maintain their own extensive research departments, but the ability to call in the highest possible class of additional expert advisers would doubtless be appreciated, especially in cases of unusual emergency.²

As a case in point the United Fruit Co. has for years been suffering heavy losses from the ravages of the banana wilt disease on some of their extensive Central American estates. Their early attempts at hiring expert advisers proved unfortunate, no workable remedies having been suggested by the pathologists employed. As a consequence banana planting has been abandoned on large areas and expensive railroad and other equipment is lying idle. It seems to be a case that is not soluble by ordinary pathological methods. If a council of experts had been available bringing a broader viewpoint to bear on the problem it is likely that some practical solution could long since have been arrived at with great financial advantage to the company. Long range advice without personal investigation is always risky, but in this case the most obvious method for combating banana wilt would seem to be to plant these lands in sugar cane for a term of years. This crop is adapted to banana lands and it would fully utilize the railroad and other equipment. After the wilt fungus had died out of the soil (requiring an unknown number of years) a portion or all of the lands could be again planted to bananas, if that seemed desirable while other lands less well adapted to bananas could be planted to cane to keep up a supply for the mills.

5. Universities, museums and other institutions planning the sending of scientific expeditions to the tropics should be invited to cooperate with this institution in order to ob-

2 Attention is called to the report on Sugar Cane Mosaic or Yellow Stripe Disease recently published in *The Journal of the Department of Agriculture* of Porto Rico, Vol. 3, No. 4, as an example of the cooperative study of a serious tropical agricultural problem.

tain the greatest possible advantages from the expenditures and efforts made.

6. Each special problem would be organized independently, the permanent secretary assigning such workers to it as at the moment were most available. All expenses, including salaries of workers, would be met by the interested parties in each case, either industries or governments. The only expense to the National Research Council would thus be the maintenance of the permanent secretary and his office force engaged in the fundamentally important work of tabulating and correlating existing knowledge of tropical conditions and resources; and of keeping in close touch with all of the many scattered institutions and workers either official or otherwise who are now engaged in any of the lines embraced in this vast field of effort.

As time went on and funds were available the institution could also take up on its own account such lines of investigation as were not being covered by any other initiative.

An organization such as is thus briefly outlined would certainly give the maximum of elasticity and breadth of view with a minimum of fixed charges. It is respectfully submitted for the consideration of the National Research Council.

F. S. EARLE

RIO PIEDRAS, PORTO RICO,
August 23

MILLS AND FISHWAYS

TO THE EDITOR OF SCIENCE: Apropos of the article by Professor Henry B. Ward entitled "Atlantic and Pacific Salmon" in SCIENCE for September 17, 1920, allow me to record some observations. Some years ago I stocked a stream running through my country place in Connecticut with rainbow trout. These trout later ran down to the estuary and could not return because of two mill dams in the way. Discussing the matter with old inhabitants I learned that in former years before the dams were built farmers living along the stream for a distance of fifteen miles or more were in the habit of catching many barrels of alewives and salting them down

for winter food supply. These families are now deprived of one important kind of food.

Following up this concrete object lesson I made observations along the Atlantic coast from Connecticut to Labrador. My conclusions are as follows:

Along the New England coast mills are commonly the property of local stockholders and these represent the influential men in a locality. Their first interest is in the mill and its economical management. This excludes the idea of the expense of a fishway. Fish which formerly supplied large numbers of people in the vicinity and at a distance and which naturally would supply the people for all time are prevented from ascending streams for breeding purposes. When the matter is taken up for action by a large number of indignant people they find themselves in conflict with a few influential men personally interested in the dam. This minority has the largest degree of influence with legislators. Along the entire New England coast such appears to be the situation in relation to salmon, shad, and alewives.

Upon reaching the Maritime Provinces of Canada I found a somewhat different situation. The traditions of an older civilization in regard to maintaining large food supply prevail to some extent. They come into conflict with the mill owner and his stockholders to such a degree that some of the streams remain open to anadromous fish, with the aid given by fishways.

Leaving the Maritime Provinces on the way northward I found a third order of conditions prevailing. The men who own cod traps and large nets are the men most influential with legislators. Constituting a small but potent minority they are enabled to injure food supply for the public by their manner of using cod traps and large nets. On some of the runways to salmon rivers the cod traps appear to pick up a large part of the annual run of salmon and the net fisherman at the mouths of the river deplete the fish supply by unlawful obstruction to the run of breeding fish.

My comments do not relate to hearsay but